The following misprints and slips were noticed:

p. 14, last formula: read $(mnp + n\alpha + m\beta)$ for $(mnp + \alpha + \beta)$;

p. 22, last line: read $0 \leqq b_i < n$ for $0 < b_i < n$;

p. 28, exercise 8: read " is " for " as ";

p. 93, Index: read " Primitive ϕ-roots " for " Primitive ψ-roots."

In p. 29, line 2, the word " simplest " may be a little misleading.

The author is to be congratulated on his happy selection of material which permits him, in this small volume, to give a clear insight into the methods employed in elementary number-theory, as well as to present in a well-connected fashion the principal results.

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Trigonometry. By MAXIME BÔCHER and HARRY DAVIS GAYLORD. New York, Henry Holt and Company, 1914. ix + 142 pp.

The authors have stated in the preface that "this text-book has been prepared with a view to giving an adequate treatment of what is essential, in a form sufficiently concise so that the real simplicity and brevity of the subject may be in evidence," and that "the number of principles involved is very limited and should not be artificially multiplied by the formulation of rules." This ought to be the aim of every text-book on elementary trigonometry, but mathematicians will differ in their opinions as to what constitutes real simplicity and brevity. In reviewing this text its object must be kept in mind. We must also not overlook the fact, implied in the preface, that the text is not intended primarily for college classes, but also for beginners in the subject.

Chapter I, covering 19 pages, after defining the six trigonometric functions for acute angles, etc., treats among others the following topics: the use of trigonometric tables, solution of right triangles, projections of line segments, line values and the variation of trigonometric functions for angles of the first quadrant, simple trigonometric identities and the solution of easy trigonometric equations.

Chapter II introduces the student to logarithms. The logarithm of a number is first defined for the base 10, and the four fundamental principles are derived for logarithms of this base. In a subsequent section, in small type, the logarithm of a number is defined for any base, and the formula for the change of base is given, the method of derivation being indicated by a numerical example. Throughout the text the logarithms of numbers less than unity are written with negative characteristics and positive mantissas, the usual method being mentioned on page 25. The co-logarithm is used extensively. A student who uses the rule for the logarithm of a quotient and does not use co-logarithms, will find himself confronted with an expression of the type, $\bar{4}.42357 - \bar{3}.96284$, which the text does not adequately consider.

Chapter III devotes 24 pages to the consideration of the topics: directed angles of any magnitude, directed line segments, the trigonometric functions of angles of any magnitude, etc., closing with a few examples in trigonometric identities, the solution of trigonometric equations and a brief note on inverse

trigonometric functions. The addition of the paragraph entitled, "Alternative Form of Definition," page 36, is commendable and will aid the student in understanding the line values of the tangent and secant of the second quadrant angle, Fig. 23, page 38. The omission of the laws for the addition of directed line segments and the addition of directed angles is to be regretted. Section 22 treats of the important principles whereby the functions of any angle can be expressed in terms of the functions of an angle not greater than 45°. Only two pages are given to this work. One figure, illustrating the method of proof for the case $A + 90°$, A being taken acute, is all the student has to aid him in grasping the contents of the section. The principles are nowhere formulated. The chief criticism against this chapter is that it leaves the bulk of the work to be done by the instructor and makes the student dependent upon notes taken in class, instead of giving him a clearly written, well illustrated chapter on the subject. Students, in general, are not investigators, and many examples well explained and illustrated, whenever possible, are necessary to impress firmly the principles upon their minds.

The next chapter deals with the solution of oblique triangles. The last two chapters are devoted to the study of spherical geometry, the formulæ of spherical trigonometry and the solution of spherical triangles. At the end of the text are to be found numerous and excellent exercises which are arranged to correspond with the chapters and their sections.

The text has an individuality and a newness of presentation which are attractive and stimulating, yet it is the opinion of the reviewer that real simplicity and clearness have been sacrificed for brevity.

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Algebraic Invariants. Mathematical Monographs edited by MANSFIELD MERRIMAN and ROBERT S. WOODWARD. No. 14. By LEONARD EUGENE DICKSON, Professor of Mathematics in the University of Chicago. John Wiley & Sons, New York, 1914. x + 100 pages. $1.00.

The series of monographs to which the present volume belongs is one of the most praiseworthy undertakings relating to American mathematical publications. It is very lamentable that some American mathematicians have been discouraged from preparing treatises on higher mathematics by the fact that American publishers have often hesitated to assume the expense of publication unless the particular work under consideration would promise to be a financial success. This has made us more dependent upon works in foreign languages than would otherwise have been the case, and it has had a bad indirect influence. In fact, at least two very eminent and extensive mathematical works which were prepared in this country have been published in a foreign language.

To the credit of American publishers it should however be stated that in recent years there have appeared in America a number of treatises of such high mathematical standing as to make it seem unlikely that these particular works